



NASA Dryden Flight Research Center
PROCUREMENT QUALITY REQUIREMENTS



Q-1

Section A: Aircraft Assemblies, Parts and Materials

Supplier shall only deliver aircraft assemblies, parts and materials that comply with the following requirements for new, surplus and used and or repaired articles. Concessions to these requirements may be granted, but only by written authorization following review by the Government's Engineering, Quality Assurance and Contracting Officer's Technical Representatives.

Unless otherwise specified for delivery to the Government, all applicable material test reports, processing, overhaul, repair and maintenance certifications, inspection, test and non-destructive examination results shall be retained for at least 10 years by the supplier, and made available upon request.

Supplier shall ensure that articles conform to all original design and manufacturing requirements for materials, processing, inspection, test, non-destructive examination, marking, packaging, preservation and transportation.

For each article (New, Surplus, Used and/or Repaired) the supplier shall identify:

- Manufacturer's part number, and heat, batch or serial number (when applicable).
- Manufacturer's name, date of manufacture and street address of production facility and/or article's maintenance, repair or overhaul facility.
- Proof of serviceability by the appropriate depot/organization serviceable tag or by FAA Parts Manufacturing Approval (PMA) or Technical Standard Order Authorization (TSO) Form 8130 accompanying each article.
- Verify that articles conform to all applicable requirements for materials, processing, inspection, test, non-destructive examination, marking, packaging, preservation and transportation.
- Identify any article (if applicable) obtained from an aircraft that was subjected to extreme environmental or operational stress, suffered a major failure or accident or was operated by a non-U.S. entity.
- Provide the implementation status of each applicable FAA Airworthiness Directive and manufacturer's Service Bulletin.
- Ensure that each component with a shelf life has been identified, including associated expiration dates.

Section B: Counterfeit Prevention of Electronic Parts

Supply Chain Traceability for Electronic Parts

The supplier shall maintain a method of item traceability that ensures tracking of the supply chain back to the manufacturer of all Electrical, Electronic, and Electromechanical (EEE) parts included in assemblies and subassemblies being delivered per this order. This traceability method shall clearly identify the name and location of all of the supply chain intermediaries from the manufacturer to the direct source of the product for the supplier and shall include the manufacturer's batch



NASA Dryden Flight Research Center
PROCUREMENT QUALITY REQUIREMENTS



identification for the item(s) such as date codes, lot codes, serializations, or other batch identification.

Test and Inspection Requirements for Electronic Parts

The supplier shall establish and implement test and inspection activities necessary to assure the authenticity of purchased product, including:

- Traceability and documentation verification
- Visual examination

Upon request, the supplier shall provide inspection and test reports demonstrating product conformance to specified criteria.

Only personnel trained and qualified in the detection of counterfeit parts will perform test and inspection activities.

Section C: Certification of Conformance

As part of each shipment, the supplier / manufacturer shall certify contract / order conformance to the Government.

Supplier / manufacturer shall identify the shipped product in a manner that is traceable to the included Certification of Conformance.

The Certification of Conformance shall:

- Confirm that the supplier / manufacturer has verified the acceptability of all articles before shipment – by completion of the necessary inspections, tests, audits, process controls and records reviews.
- Identify the contract / order number, and relevant line item number.
- Identify the manufacturer's part number, and heat, batch or serial number (when applicable).
- Identify the shipped quantity and unit of measure.
- Be signed by a duly authorized officer or quality representative of the supplier / manufacturer – whose name and title shall be legible.

Section D: Process Qualification and Control (Calibration)

For each ***calibrated tool, gauge, instrument or other calibrated device*** purchased by the Government, the manufacturer's certified calibration report and Certification of Conformance shall be provided.

Each calibration report shall:

- Identify a unique calibration report / tracking number.
- Be traceable to the customer contract / order number.
- Identify the device's name, model number, and when applicable, its serial number.



NASA Dryden Flight Research Center
PROCUREMENT QUALITY REQUIREMENTS



- Identify the manufacturer's recommended recalibration frequency.
- List the date of initial calibration.
- List the calibration technician's name.
- List the relevant environmental conditions for each parameter calibrated.
- Identify each standard that was used in the device's calibration, including:
 - Each standard's unique identifier, with NIST traceability.
 - The nominal value of each standard, as determined during its most recent calibration.
- Record the value obtained by the device for each standard used in the calibration.

Section E: Delivery Requirements

To assure protection from damage during normal handling, transport, and storage after receipt, articles and materials shall be packaged and preserved in accordance with NPR 6000.1 – Packaging, Handling, and Transportation:

- Level B – Preservation, Packaging, and Packing.
- Class I – Shipping and Handling.

Marking shall include, as a minimum, nomenclature, part number, quantity, supplier, expiration date, temperature handling requirements and lot/batch information.

Items containing hazardous materials shall have the manufacturer's Material Safety Data Sheet (MSDS) included.

Articles or materials which have shelf life limitations or storage control requirements imposed by the manufacturer, Government, NASA or the contractor shall be accompanied by positive indication of such limits. Examples include manufacturing date, cure date, assembly date or temperature storage limitation.

Articles and materials shall have a minimum of seventy-five percent of the manufacturer's designated shelf life remaining at the time of shipment.

Approved Sept 2011

Jaime Garcia

Steve Foster



NASA Dryden Flight Research Center
PROCUREMENT QUALITY REQUIREMENTS



Q-2

A. Certified Material Test Report and Aircraft Fastener Testing

Supplier shall include in each shipment the raw material manufacturer's test report. The test report shall certify that the relevant lot of raw material has been tested, inspected and verified compliant with the applicable specifications and is traceable to the Certified Material Test Report. .

The Certified Material Test Report shall contain the following:

1. Identify the raw material heat/lot number to which the report applies.
2. Identify the applicable raw material specifications, by number and revision level.
3. List the actual test / inspection values obtained for each chemical and physical property in the raw material specifications.
4. Identify the raw material manufacturer.
5. Be signed by a duly authorized officer or quality representative of the raw material manufacturer.
6. Test specimen gage diameter per ASTM E
7. Specifications including revision numbers or letters to which the material has been tested and/or inspected
8. When the material specification requires quantitative limits for chemical, mechanical, or physical properties, the test report shall contain the actual test and/or inspection values obtained.
9. No unauthorized processes (i.e. re-melt) shall be allowed.

Non-Destructive Evaluation Certifications

When Non-Destructive Evaluation is required the contractor shall provide a Certificate of Conformance (C of C) to certify that the material meets the related requirements.

Independent Laboratory Testing

If the material was altered (forged, rolled, heat treated etc.) subsequent to procurement from the mill and prior to delivery to DFRC, an Independent Laboratory Test shall be submitted with the material. The testing must be performed after all subsequent conversion processing. The test report must comply with requirements above for Manufacturer Test Certifications.

Prohibited

The contractor shall not provide material that has been machined down, sawed or by any other means to achieve the requested thickness or diameter.

The contractor shall not substitute cut plate for bar stock.

Approved Sept 2011

Jaime Garcia

Steve Foster



NASA Dryden Flight Research Center
PROCUREMENT QUALITY REQUIREMENTS



Q-4

ELECTRICAL WIRE for Aircraft and Flight Test Electrical Wire / Cable

1. Procurement of wire shall be in one continuous length as specified in the purchase order. Roll "xxx" feet long in one continuous length. No splices or split lengths allowed.
2. Type - Unless otherwise specified or required for particular applications (i.e. space applications, specific chemical resistance, etc.), all electrical wire shall be in accordance with the following specifications and requirements:
 - a. MIL-W-16878/4 (type E) or MIL-W-22759/11 (preferred), silver-coated stranded copper conductor with an extruded polytetrafluorethylene (PTFE) insulation, or equivalent, not to include polyvinylchloride (PVC).
 - b. Wire stranding shall be the maximum number available by specification for the particular wire size concerned
 - c. Where required, shielding shall be of silver-coated braided copper construction with a minimum of 90% coverage.
 - d. Where required, cable jacketing shall be of polytetrafluorethylene (PTFE) material, not ETFE (Tefzel).
 - e. Cables and other multi-conductor assemblies shall be fabricated from the basic components listed above under Military Specification MIL-W-16878D (uses MIL-W-16878 conductors) or MIL-C-27500 (uses MIL-22759), as required.
 - f. Cables and other multi-conductor assemblies shall be fabricated from the basic components listed above under Military Specification MIL-W-16878D (uses MIL-W-16878 conductors) or MIL-C-27500 (uses MIL-22759), as required.
 - i.e. M27500 V 22 RC 4 S 06
 - M27500 - Cable specification identification number
 - V - Color code of inner conductors; specified by the procuring activity.
 - 22 - Gauge of the conductors within the cable assembly.
 - RC - Designates manufacture to construct cable using MIL22759/11 conductors; silver coated copper wire with PTFE insulation.
 - 4 - Number of individual conductors in the cables construction.
 - S - Specifies single silver coated copper shielded cable with 90% coverage.
 - 06 - Cable with PTFE tape wrapped, 200°C, jacket material.



NASA Dryden Flight Research Center
PROCUREMENT QUALITY REQUIREMENTS



g On USAF loaned A/C, aircraft systems wiring (i.e. wire not installed as part of flight research modifications) shall conform to the particular aircraft's wire repair Technical Order or per T.O. 1-1A-14 when wire type is not specified in the aircraft's wire repair manual(s).

3. Selection – Select wire so that the rated maximum conductor temperature is not exceeded for any Combination of electrical loading, ambient temperature, and heating effects of bundles, conduit, and other enclosures. Factors to be considered in the selection are operating voltage, circuit current, temperature, mechanical strength, voltage drop, abrasion, flexure, pressure altitude, and chemical resistive requirements. Wires will be of sufficient size to ensure that they will provide adequate current-carrying capability and that voltage drops will be within limits required to provide satisfactory operation of equipment. Voltage drop effects must be carefully considered during wire gauge selection, especially when low impedance devices (such as multiple strain gauges, meter movements) or long wire runs are used. To avoid unnecessary weight, use the smallest size wire compatible with operational and performance requirements. Wire selection guidance is contained in section 6 of SAE AS50881, including wire ampacity derating factors such as altitude, wire bundling effects, etc.
4. Minimum wire size – The following limitations are applicable to all general wiring installations. Exceptions and deviations may be required for particular DFRC applications and are approved when properly specified on drawings or other technical references. Where possible, the use of the defined wire and cable per this document will be used. If alternative types must be used for unique DFRC installations, a waiver and justification must be created for the application per DOP-O-401 Section 8.0
 - a. Wires smaller than 24 gauge shall not be used, except for multi-conductor cables, and when specifically authorized.
 - b. Wire smaller than size 22 gauge shall not be used, where it will be subject to excessive vibration, repeated bending, excessive handling or frequent connection/disconnection at terminals.
 - c. Single conductor wire smaller than size 22-gage will not be routed in bundles with fewer than three other wires, and they will be adequately supported at the terminations

Approved Sept 2011

Jaime Garcia

Steve Foster



NASA Dryden Flight Research Center
PROCUREMENT QUALITY REQUIREMENTS



Q-5

A. ELECTRICAL/ELECTRONIC ARTICLES AND MATERIALS

This attachment is in reference to custom manufactured procurements in which NASA handbooks or DOD documents are specified. If a NASA approved parts list is utilized or the part comes from a Defense Electronic Supply Center, this attachment may not be applicable.

A certification of conformance is required for all custom parts. These parts require a Non Standard Parts Approval Report (NSPAR) prior to use. These parts are made from source control drawings (SCD). This type part includes any Electrical, Electronic or Electromechanical (EEE) part that has been modified or is not used as intended. Custom parts require build records, test data and destructive physical analysis (DPA) data accompany the parts.

All EEE parts affected by this attachment require trace ability from the manufacturing location by Cage Code to where the parts were made. Parts require full trace ability to lot, date code, and batch code type data.

Approved Sept 2011

Jaime Garcia

Steve Foster



NASA Dryden Flight Research Center
PROCUREMENT QUALITY REQUIREMENTS



Q-6

AGE CONTROLS OF SYTHENTIC ELASTOMERS

1. Age-sensitive elastomeric articles and materials conforming to the following specifications shall be in conformance with the applicable age controls defined in paragraph 3 at the time of delivery to NASA DFRC.

Part Hose/Hose assemblies

- ☐ AMS-7260 MIL-P-5315 Packing, Pre-formed, Hydrocarbon Fuel Resistant
- ☐ AMS-7270 MIL-P-5510
- ☐ AMS-7271 MIL-P-5516
- ☐ AMS-7272 MIL-R-6855, (Class 1 only)
- ☐ AMS 7274 MIL-R-7362
- ☐ MIL-H-5593 HOSE, AIRCRAFT, LOW PRESSURE AIR AND VACUUM, FLEXIBLE
- ☐ MIL-H-6000 HOSE, RUBBER, AIRCRAFT, FUEL, OIL, COOLANT, WATER, AND ALCOHOL
- ☐ MIL-H-7061
- ☐ MIL-H-7398
- ☐ MIL-H-8788 HOSE, RUBBER, HYDRAULIC, HIGH PRESSURE (3,000 PSI), OPERATING TEMPERATURE RANGE -65°F to +160°F
- ☐ MIL-P-25732
- ☐ MIL-H-8790 (see 3.a & 3.b.)
- ☐ MIL-H-8794 HOSE, SYNTHETIC RUBBER - HYDRAULIC FLUID, FUEL, AND OIL RESISTANT
- ☐ MIL-H-8795 (see 3.a. & 3.c.)

2. These requirements do not apply to silicone rubber, fluorocarbon rubber, fuel cell synthetic materials, and static seals used with fasteners.

- A "component" is an accessory, combination of parts, or assembly.
- NASA DFRC includes legally responsible organizations or individuals acting for NASA DFRC, a prime contractor to NASA DFRC, or a subcontractor.



NASA Dryden Flight Research Center
PROCUREMENT QUALITY REQUIREMENTS



3. Age Limitations Age in Quarters

- For articles and materials not assembled in a component, including bulk hose:
- From CURE DATE to delivery to NASA DFRC:...from the manufacturer or his agent 4 ...from other sources 6
- For articles and materials assembled in components, provided that elastomer items installed in the component shall exceed
- 8 quarters from cure date to installation in such component:
-

From ASSEMBLY DATE to delivery to NASA DFRC:... of an installed component 4 of an uninstalled component as a spare by the flight vehicle or 8 engine contractors, or of a complete engine by engine contractors 8 of a component installed in a flight vehicle

4. Elastomer articles and materials manufactured or installed during any given quarter will not be considered one quarter old until the end of the succeeding quarter. Packages, which include mixed categories of cured elastomer articles and materials shall be marked with the assembly date of the oldest assembly in the package.
NASA Dryden Flight Research Center

Approved Sept 2011

Jaime Garcia

Steve Foster



NASA Dryden Flight Research Center
PROCUREMENT QUALITY REQUIREMENTS



Q-9

IDENTIFICATION AND DATA RETRIEVAL

1. General. The Contractor shall maintain an identification and data retrieval system for articles and materials. Identification of articles is traceable to the procurement document, fabrication process, inspection, test and operating records.
2. Part and Type Numbers. Unique part or type numbers batch, lot, heat number or other unique identification shall identify articles and materials.
3. Detailed Identification. Articles or materials, which require group or individual control because of critical application or age limitations. The following are examples of acceptable methods of identification.
 - a. Date Codes - applicable when manufactured in a continuous and controlled process or for age-limited items.
 - b. Lot numbers - applicable when produced in homogeneous groups and there is no requirement to identify an individual item.
 - c. Serial Numbers - applicable to individual items for which unique data is to be maintained. Serial numbers shall be issued and controlled in a manner to prevent duplication. Serial numbers shall consist of a minimum of three (3) digits (including zeros). Where the selection and application of detailed identification numbers is arbitrary; all such numbers shall be assigned in a consecutive manner. Serial or lot numbers of articles previously scrapped shall not be used again.
4. Standard hardware requires no tractability or identification. Examples of standard hardware include items marked as (MS, NAS, etc.). Procurement documents may require Items of standard hardware be uniquely identified for special applications.

Approved Sept 2011

Jaime Garcia

Steve Foster



**NASA Dryden Flight Research Center
PROCUREMENT QUALITY REQUIREMENTS**



Q-10

Process Qualification and Control

For key processes, the supplier and its sub-suppliers shall qualify and control processing equipment and processing parameters, and shall train and certify associated personnel.

Key processes include:

- Special Processes (e.g. weld, solder, heat treatment, composite lay-up, bonding, etc.).
- Non-Destructive Examination (e.g. radiography, dye penetrant, ultrasonic, etc.).

The supplier and its sub-suppliers shall have defined programs for the qualification, release for production, and ongoing control of key processes, including:

- Defined process qualification and requalification acceptance criteria.
- Under what circumstances process requalification is necessary.

The supplier and its sub-suppliers shall have defined training programs leading to the certification of personnel that implement key processes, including:

- Satisfactory completion of an examination and/or a demonstration of proficiency.
- Defined certification and recertification acceptance criteria.
- Under what circumstances personnel recertification is necessary.

The supplier and the Government's QA Representative shall jointly review the supplier / sub-supplier's production planning documents in order to identify those process qualification and personnel certifications to be reviewed by the Government.

Approved Sept 2011

Jaime Garcia

Steve Foster